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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,180	10/30/2003	Girish Upadhy	COOL-00800	9903
28960	7590	11/27/2007		
HAVERSTOCK & OWENS LLP			EXAMINER	
162 N WOLFE ROAD			CIRIC, LJILJANA V	
SUNNYVALE, CA 94086				
			ART UNIT	PAPER NUMBER
			3744	
			MAIL DATE	DELIVERY MODE
			11/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/698,180

Applicant(s)

UPADHYA ET AL.

Examiner

Ljiljana (Lil) V. Ciric

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-109 is/are pending in the application.
- 4a) Of the above claim(s) 76-93 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-75 and 94-109 is/are rejected:
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action is in response to the reply filed on October 5, 2007.
2. Claims 1 through 109 remain in the application. Of these, claims 76 through 93 remain withdrawn from consideration as noted in greater detail below, whereas claims 1 through 75 and claims 94 through 109 have all been amended, either directly or indirectly.

Response to Arguments

3. Applicant's arguments with respect to the claims have been considered but are moot in view of the new grounds of rejection presented herein below.

Election/Restrictions

4. Claims 76 through 93 hereby remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 12, 2007.

Drawings

5. The drawings were received on October 5, 2007. These drawings are hereby approved.

Specification

6. Receipt and entry of the amended abstract is hereby acknowledged.

Claim Objections

7. Claims 17, 47, 64, and 109 are objected to because each contains a set of alternative limitations which are not written in proper Markush format. Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 67 through 71 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitations following "wherein" in claim 67 are not clear as written, thus rendering indefinite the metes and bounds of protection sought by claim 67 and claims 68 through 70 depending therefrom.

Also, it appears that one or more words are missing from claim 71 immediately following "wherein the spreader region" in line 1 of the claim, thus rendering indefinite the metes and bounds of protection sought by the claim.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

11. Claims 1 through 3, 5, 13, 17 through 19, 21 through 25, 27 through 29, 36, 37, 44, 46 through 50, 52, 66, 67, 71, 72, 74, 75, 94, 95, 97, 105, and 109 are rejected under 35 U.S.C. 102(b) as being anticipated by Fuesser et al.

Fuesser et al. discloses device for fluid-cooled (i.e., water-cooled) micro-scaled heat exchange essentially as claimed, including, for example: one or more heat sources or electronic components 1; a micro-scaled region 14 or 24 configured to permit fluid flow therethrough; a spreader region or thermal conductor 11 or 21 or 22 comprising a first side and a second side, the first side being coupled to at least one heat source or electronic component or microprocessor 1 and the second side being coupled to the micro-scaled region 14 or 24; the micro-scaled region 14 or 24 comprising microchannels 13 with walls 15 [i.e., see Figure 1] or microchannels 33 with micro-pillars 35 [i.e., see Figure 5]; a plurality of paths 16 and 17 or 26 and 27 or 36 and 37 coupled to the micro-scaled region; the micro-scaled region 14 comprising silicon or a semiconducting material or a material having a thermal conductivity larger than 25 W/m-K such as diamond [see column 3, lines 14 through 38]; the spreader 11 comprising diamond or silicon carbide (i.e., carborundum, a diamond-like carbon) [see column 3, lines 33-52] which has a thickness as specified in claim 2 of the instant application; the micro-scaled region 24 is coupled to the spreader region 21 or 22 by soldering [see column 6, lines 14-26].

The reference thus reads on the claims.

12. Claims 1 through 3, 9, 17, 25, 36, 37, 48 through 50, 56, 64, 66, 67, 72, 94, 95, 101, and 109 are rejected under 35 U.S.C. 102(e) as being anticipated by Manginell et al.

Manginell et al. discloses device essentially as claimed, including, for example: one or more heat sources 13; a micro-scaled region 14 configured to permit fluid flow therethrough; a spreader region 12 comprising a first side and a second side, the first side being coupled to at least one heat source 13 and the second side being coupled to the micro-scaled region 14; the micro-scaled region 14 comprising a microporous structure; and, a plurality of paths 17 and 18 coupled to the micro-scaled region 14.

The reference thus reads on the claims.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 4, 6 through 8, 14 through 16, 20, 22, 23, 26, 38 through 43, 45, 51, 53 through 55, 61 through 63, 68 through 70, 73, 96, 98 through 100, and 106 through 108 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuesser et al.

As described in greater detail above, Fuesser et al. discloses a device for fluid-cooled micro-scaled heat exchange from a heat source, including a micro-scaled region 14 or 24 and a spreader region 11 or 21 or 22 essentially as claimed, as well as the micro-scaled region 14 or 24 being bonded (such as by soldering) to the spreader region 11 or 21 or 22, but fails to specifically disclose the dimension ranges for the various elements (such as for the microchannel walls and for the micropillars) as recited in the instant claims and also fails to identify suitable bonding methods other than soldering. Fuesser et al. also fails to disclose that the spreader region 11 or 21 or 22 comprises copper, for example.

Nevertheless, absent a disclosure of unexpected results, the various recited dimensions in the instant claims constitute obvious design optimization rather than inventiveness and thus fail to patentably distinguish the claims over Fuesser et al., especially since Fuesser et al. discloses the overall device as well as thickness of the spreader region 11 or 21 or 22 as being sized generally within the order of magnitude of the instant inventive apparatus.

Official Notice is hereby taken that heat spreaders comprising a variety of materials, including copper (alone or in combination with other materials), are well-known in the art. Official Notice is also

hereby taken that various methods of bonding in addition to soldering—such as adhesive bonding, brazing, welding, and epoxy bonding—are well-known in the art and are also well-known equivalents of soldering.

Thus, it would have been obvious to one skilled in the art at the time of invention to modify the device of Fuesser et al. by optimizing the dimensions of the various micro-scaled elements to meet various heat transfer and/or flow and/or manufacturability requirements for a given application, and that it would have been equally obvious to make the heat spreader of the device from any number of heat-conducting materials with desirable high heat transfer properties, including copper alone or in combination with other materials, in order to maximize the transfer of heat away from the heat source. Last but not least, it would have been obvious to one skilled in the art at the time of invention to modify the device of Fuesser et al. by bonding the spreader region to the micro-scaled region using any one of a number of known suitable bonding methods, where the particular bonding method is chosen to best suit the materials being bonded together as well as the expected operating temperatures of the device in order to minimize manufacturing costs while maximizing the robustness of the device.

15. Claims 10 through 12, 57 through 59, and 102 through 104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manginell et al.

As discussed in greater detail above, Manginell et al. discloses device essentially as claimed, including, for example, a micro-scaled region 14 configured to permit fluid flow therethrough and having a microporous structure, as well as a spreader region 12. Manginell et al., however, fails to specifically disclose the dimension ranges for porosity, pore size, and other dimensions of the micro-porous structure as recited in the instant claims.

Nevertheless, absent a disclosure of unexpected results, the various recited dimensions in the instant claims constitute obvious design optimization rather than inventiveness and thus fail to patentably distinguish the claims over Manginell et al., especially since Manginell et al. discloses the device and the

spreader region 12 as being sized generally within the order of magnitude of the instant inventive apparatus.

Thus, it would have been obvious to one skilled in the art at the time of invention to modify the device of Manginell et al. by optimizing the dimensions of the various elements of the micro-porous region to meet the heat transfer and/or flow and/or manufacturability requirements for a given application.

Double Patenting

16. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

17. Claims 1 through 75 and 94 through 109 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over at least claims 1 through 100 of U.S. Patent No. 7,000,684, issued to Kenny et al. on February 21, 2006. Although the conflicting claims are not identical, they are not patentably distinct from each other because the only differences between the claims are obvious ones, such as the omission of elements whose function is not necessary, overlapping ranges which are of the same order of magnitude but have different endpoints, and the substitution of slightly narrower or broader claim language for otherwise generally equivalent terminology.

Conclusion

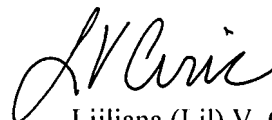
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18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ljiljana (Lil) V. Ciric whose telephone number is 571-272-4909. The examiner works a flexible work schedule but can normally be reached on most days during the work week between the hours of 10:30 a.m. and 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J. Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ljiljana (Lil) V. Ciric
Primary Examiner
Art Unit 3744